

## Improved Glycemic Control through Continuous Glucose Sensor-Augmented Insulin Pump Therapy: Prospective Results from a Community and Academic Practice Patient Registry

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### Abstract

#### Background:

Conducted by highly experienced investigators with abundant time and resources, phase III studies of continuous glucose sensing (CGS) may lack generalizability to everyday clinical practice.

#### Method:

Community or academic practices in six Central and Eastern European or Mediterranean countries prospectively established an anonymized registry of consecutive patients with type 1 insulin-dependent diabetes mellitus starting CGS-augmented insulin pump therapy with the Paradigm® X22 (Medtronic MiniMed, Northridge, CA) under everyday conditions, without prior CGS with another device. We compared glycosylated hemoglobin (GHb) values before and after 3 months of CGS and assessed relationships between insulin therapy variables and glycemia-related variables at weeks 1, 4, and 12 of CGS.

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**Abbreviations:** (ANCOVA) analysis of covariance, (AUCH) glucose area >140 mg% normalized to 7 days of the continuous glucose sensor download, (AUCL) glucose area <70 mg% normalized to 7 days of the continuous glucose sensor download, (BAS) basal insulin dose as a percentage of the total daily insulin dose, (BG) weekly mean glucose level, (BOL) number of daily boluses, (CEEGI) Central and Eastern Europe, Greece, and Israel, (CGS) continuous glucose sensing, (DCCT) Diabetes Control and Complications Trial, (GHb) glycosylated hemoglobin, (HEX) number of glucose excursions above 140 mg%, (IFCC) International Federation of Clinical Chemistry and Laboratory Medicine, (INS) total daily insulin dose, (LEX) number of glucose excursions below 70 mg%, (MANOVA) multivariate analysis of variance, (SD) standard deviation, (SDEV) standard deviation glucose

**Keywords:** continuous glucose sensing, continuous subcutaneous insulin infusion, everyday practice, glycemic control, hypoglycemic excursions, patient registry

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### **Abstract cont.**

#### **Results:**

Of 102 enrolled patients, 85 (83%) with complete weeks 1, 4, and 12 sensor data and baseline/3-month GHb data were evaluable. Evaluable patients were ~54% male and ~75% adult (mean age,  $33.2 \pm 16.9$  years) with longstanding diabetes and high personal/family education levels. Mean GHb declined significantly after 3 months of CGS ( $7.55 \pm 1.33\%$  at baseline to  $6.81 \pm 1.08\%$  after 12 weeks, 0.74% absolute decrease,  $P < 0.001$ ). The absolute GHb reduction correlated significantly ( $P < 0.0005$ ) with baseline GHb: larger absolute reductions tended to occur when baseline levels were higher. An increased basal insulin dose as a percentage of the total daily insulin dose and a decreased daily bolus count from week 1 to week 12 of CGS predicted GHb improvement from baseline to week 12.

#### **Conclusions:**

CGS-augmented insulin pump therapy appears to improve glycemic control in type 1 diabetes in varied everyday practice settings.

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